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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,494	12/07/2001	Bulent M. Basol	042496/0277563 NT-0229(U)	5643

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PILLSBURY WINTHROP LLP
1600 Tysons Boulevard
McLean, VA 22102

EXAMINER	
COLBERT, ROBERTS P	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/017,494	BASOL ET AL.	
	Examiner	Art Unit	
	Roberts Culbert	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-60 is/are pending in the application.

4a) Of the above claim(s) 1-33 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 34-60 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-60 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 07 December 2001 is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-33, drawn to an apparatus, classified in class 156, subclass 345.13.

II. Claims 34-60, drawn to a method, classified in class 216, subclass 88.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process such as polishing a insulating substrate.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification and recognized divergent subject matter, and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with David A. Jakopin on 10/03/03 a provisional election was made without traverse to prosecute the invention of Group II, claims 34-60. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-33 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
> This application currently names joint inventors.

In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 34-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of U.S Patent 6,179,691 to Lee et al.

The admitted prior art teaches an electrochemical mechanical deposition process that uses a solution containing a conductor therein and operates upon the multi-layer work-piece comprising the steps of: depositing the conductor on the top surface of the work-piece in the presence of a work-piece surface influencing device, an applied potential and the solution using electrochemical mechanical deposition;

Regarding claims 39, 50, 51, 59, and 60, the admitted prior art also teaches that the to surface may be a conductive or insulator surface and that the step of operating deposits a conductor into the features disposed in the top surface of the work-piece.

The admitted prior art does not teach a method for detecting planarization of a top surface of a multi-layer work-piece by transmitting a beam of light onto the top surface of the work-piece to obtain a reflected beam of light, a characteristic of the reflected beam of light being altered by a top surface pattern that exists due to the features within the top surface of the work-piece; and detecting a change in

the characteristic of the reflected beam of light indicative of a change in the top surface pattern of the work-piece.

Referring to figure 1 and the disclosure (Col. 3, Line 54-67), Lee et al. teaches a prior art method for detecting planarization of a top surface of a multi-layer work-piece by transmitting a beam of light (24) onto the top surface of the work-piece to obtain a reflected beam of light (26), a characteristic of the reflected beam of light being altered by a top surface pattern that exists due to the features within the top surface of the work-piece (Col. 4, Lines 10-13); and detecting a change in the characteristic of the reflected beam of light indicative of a change in the top surface pattern of the work-piece (Col. 3, Line 67, and Col. 4, Lines 7-10).

Regarding claim 52 the signal obtained in the detection method of Lee contains information indicative of the planarity of the top conductive layer at various points in time, thereby detecting the non-planar surface becoming more planar over time, since Lee measures the intensity of reflected light as stated above.

Regarding claim 53, Lee teaches detecting a characteristic of the reflected beam of light (intensity) being altered by a top surface pattern that exists due to the features within the top surface of the work-piece; and detecting (measuring) the characteristic of the reflected beam of light indicative of a change in the top surface pattern of the work-piece and transforming that characteristic (intensity) into the information in the signal (termination of the planarizing process), such that a change in the detected characteristic at various pints in time indicates the non-planar top surface becoming more planar over time.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the detection method of Lee to detect planarization of the surface being planarized in the method of the instant application since Lee teaches that the disclosed optical detection method is suitable for determining planarization of a conductive (copper) layer deposited on a substrate in the presence of a work-piece surface influencing device.

Regarding claim 35, 46, and 54, Lee teaches that it is conventional to terminate the planarizing process when the intensity of the light beam reaches a certain level (Col. 4, Lines 4-7). Therefore, it

would have been obvious to one of ordinary skill in the art at the time of invention that the step of detecting a change further include the step of providing an indicator to halt the step of depositing when the top surface pattern of the work-piece becomes planar, thus indicating the filling of the features with the conductor. One of ordinary skill in the art would have been motivated at the time of invention to halt the planarizing process as soon as planarization is achieved in order to reduce processing time.

Regarding claims 40, 42, 44 and 58 Lee teaches that the intensity of the reflected light is monitored (Col. 3, Lines 65-67)

Regarding claims 41 and 43 Lee teaches that the beam of light transmitted onto the top surface of the work-piece passes through the work-piece surface-influencing device.

Regarding claims 36-38, 47-49, and 55-57, the admitted prior art teaches that it is conventional to form very thin planar deposits by first depositing a planar layer using an ECMD technique and then using an ECME technique on the planar film in the same electrolyte (within a same processing area) by reversing the applied voltage.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to provide a material removal step of chemical mechanical processing, within a same processing area as the step of depositing, after receipt of the indicator that planarization is complete.

Furthermore, since Lee et al. teaches a method for detecting planarization of a top surface of a multi-layer work-piece by transmitting a beam of light onto the top surface of the work-piece to obtain a reflected beam of light, a characteristic of the reflected beam of light being altered by a top surface pattern that exists due to the features within the top surface of the work-piece; and detecting a change in the characteristic of the reflected beam of light indicative of a change in the top surface pattern of the work-piece, it would have been obvious to one of ordinary skill in the art at the time of invention to use the detection method of Lee to detect planarization of the surface being planarized in the method of the instant application since Lee teaches that the disclosed optical detection method is suitable for determining planarization of a conductive (copper) layer deposited on a substrate in the presence of a work-piece surface influencing device.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to transmit another beam of light onto the top surface of the work-piece to obtain another reflected beam of light; and detect another change in a characteristic of the other reflected beam of light indicative of a new material forming a new top surface of the work-piece as taught by Lee. One of ordinary skill in the art would have been motivated at the time of invention to use the detection method of Lee to monitor the planarization method of the instant application as Lee teaches that the disclosed optical detection method is suitable for the intended purpose as stated above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (703) 305-7965. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

R. Culbert R Culbert